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**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 25**

**[Docket No. FAA-2017-0240; Special Conditions No. 25-691A-SC]**

**Special Conditions: Gulfstream Aerospace Corporation Model GVII-G500 Airplanes; Airbag Systems on Multiple-Place and Single-Place Side-Facing Seats**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final special conditions.

**SUMMARY:** These special conditions are issued for the Gulfstream Aerospace Corporation (Gulfstream) Model GVII-G500 airplane. This amendment changes an error in a reference to a special conditions number and adds one special condition. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is airbag systems on multiple-place and single-place side-facing seats. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** Effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**FOR FURTHER INFORMATION CONTACT:** Alan Sinclair, Airframe and Cabin Safety Section, AIR-675, Transport Standards Branch, Policy and Innovation Division,

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## **SUPPLEMENTARY INFORMATION:**

### **Background**

On March 29, 2012, Gulfstream Aerospace Corporation applied for a type certificate for its new Model GVII-G500 airplane. The Model GVII-G500 airplane will be a twin-engine, transport-category, business jet capable of accommodating up to 19 passengers. The Model GVII-G500 airplane will have a maximum takeoff weight of 76,850 lbs.

The FAA issued, on June 8, 2017, “final special conditions, request for comments” for airbag systems on multiple-place and single-place side-facing seats installed in Gulfstream Model GVII-G500 airplanes. The special conditions were published in the Federal Register on June 19, 2017 (82 FR 27771). These final special conditions amend those published on June 19, 2017 (82 FR 27771).

### **Type Certification Basis**

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Model GVII-G500 airplane meets the applicable provisions of 14 CFR part 25, as amended by amendments 25-1 through 25-129.

If the Administrator finds that the applicable airworthiness regulations (i.e., part 25) do not contain adequate or appropriate safety standards for the Model GVII-G500 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, Model GVII-G500 airplanes must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.17(a)(2).

#### **Novel or Unusual Design Features**

The Model GVII-G500 airplane will incorporate the following novel or unusual design feature:

Airbag systems on multiple-place and single-place side-facing seats.

#### **Discussion**

Side facing seats are considered a novel design for transport-category airplanes that include 14 CFR part 25, amendment 25-64, in their certification bases because this feature was not anticipated when those airworthiness standards were issued. Therefore, the existing regulations do not provide adequate or appropriate safety standards for occupants of side-facing seats. For the Model GVII-G500 airplane, FAA Special Conditions No. 25-618-SC, “Technical Criteria for Approving Side-Facing Seats,” provide special conditions to address the certification of single- and multiple-place side-facing seats. Those special conditions include condition number 2(e), which requires

the axial rotation of the upper leg (femur) to be limited to 35 degrees in either direction from the nominal seat position. To accommodate that requirement, Gulfstream has developed a new airbag system that will be installed close to the floor, and which is designed to limit the axial rotation of the occupant's upper legs.

This amendment changes, in the second paragraph of the Special Conditions section, an erroneous reference to Special Conditions No. 25-495-SC, which is here corrected to 25-618-SC, and adds condition number 14 to the Special Conditions section. Condition number 14 was unintentionally omitted from the previous issuance of these special conditions.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

### **Discussion of Comments**

The FAA issued Notice of Proposed Special Conditions No. 25-18-04-SC for the Gulfstream Model GVII-G500 airplane, which was published in the *Federal Register* on October 22, 2018 (83 FR 53193). No comments were received, and the special conditions are adopted as proposed.

### **Applicability**

As discussed above, these special conditions are applicable to the Gulfstream Model GVII-G500 airplane. Should Gulfstream apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the *Federal Register*. However, as this document is an amendment to the initial special conditions, and the Gulfstream Model GVII-G500 airplane was type certificated July 20, 2018, the FAA finds that good cause exists to make these special conditions effective upon publication.

### **Conclusion**

This action affects only certain novel or unusual design features on one model of airplane. It is not a rule of general applicability.

### **List of Subjects in 14 CFR Part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

### **Authority Citation**

The authority citation for these special conditions is as follows:

**Authority:** 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

### **The Special Conditions**

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Gulfstream Aerospace Corporation Model GVII-G500 airplanes.

In addition to the requirements of §§ 25.562 and 25.785, and Special Conditions No. 25-618-SC, the following special conditions are part of the type certification basis for the Gulfstream Model GVII-G500 airplane with leg-flail airbags installed on side-facing seats.

1. For seats with a leg-flail airbag system, the system must deploy and provide protection under crash conditions where it is necessary to prevent serious injury.

The means of protection must take into consideration a range of stature from a 2-year-old child to a 95th-percentile male. At some buttock popliteal length and effective seat-bottom depth, the lower legs will not be able to form a 90-degree angle relative to the upper leg; at this point, the lower leg flail would not occur. The leg-flail airbag system must provide a consistent approach to prevention of leg flail throughout that range of occupants whose lower legs can form a 90-degree angle relative to the upper legs when seated upright in the seat. Items that need to be considered include, but are not limited to, the range of occupants' popliteal height, the range of occupants' buttock popliteal length, the design of the seat effective height above the floor, and the effective depth of the seat-bottom cushion.

2. The leg-flail airbag system must provide adequate protection for each occupant regardless of the number of occupants of the seat assembly, considering that unoccupied seats may have an active leg-flail airbag system.
3. The leg-flail airbag system must not be susceptible to inadvertent deployment as a result of wear and tear, or inertial loads resulting from in-flight or ground maneuvers (including gusts and hard landings), and other operating and environmental conditions (vibrations, moisture, etc.) likely to occur in service.
4. Deployment of the leg-flail airbag system must not introduce injury mechanisms to the seated occupant, nor result in injuries that could impede rapid egress.
5. Inadvertent deployment of the leg-flail airbag system, during the most critical part of the flight, must either meet the requirement of § 25.1309(b), or not cause a hazard to the airplane or its occupants.

6. The leg-flail airbag system must not impede rapid egress of occupants from the airplane 10 seconds after airbag deployment.
7. The leg-flail airbag system must be protected from lightning and high-intensity radiated fields (HIRF). The threats to the airplane specified in existing regulations regarding lightning (§ 25.1316) and HIRF (§ 25.1317) are incorporated by reference for the purpose of measuring lightning and HIRF protection.
8. The leg-flail airbag system must function properly after loss of normal airplane electrical power, and after a transverse separation of the fuselage at the most critical location. A separation at the location of the leg-flail airbag system does not have to be considered.
9. The leg-flail airbag system must not release hazardous quantities of gas or particulate matter into the cabin.
10. The leg-flail airbag system installation must be protected from the effects of fire such that no hazard to occupants will result.
11. A means must be available to verify the integrity of the leg-flail airbag system's activation system prior to each flight, or the leg-flail airbag system's activation system must reliably operate between inspection intervals. The FAA considers that the loss of the leg-flail airbag system's deployment function alone (i.e., independent of the conditional event that requires the leg-flail airbag system's deployment) is a major-failure condition.
12. The airbag inflatable material may not have an average burn rate of greater than 2.5 inches per minute when tested using the horizontal flammability test defined in part 25, appendix F, part I, paragraph (b)(5).

13. The leg-flail airbag system, once deployed, must not adversely affect the emergency-lighting system (i.e., must not block floor-proximity lights to the extent that the lights no longer meet their intended function).
14. The leg-flail system(s) must perform its intended function after impact from any other proximate assemblies (e.g., life raft) that may become detached under the loads specified in §§ 25.561 and 25.562.

Issued in Des Moines, Washington, on February 28, 2019.

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